Airports and Other Complex Intermodel Systems

Contract #: 500-00-023 **Project #:** 9 & 44
Contractor: Electric Power Research Institute (EPRI)
Project Amount: $47,498
Match Amount: $199,700
Contractor Project Manager: Andra Michel (650) 855-2101
Commission Contract Manager: McKinley Addy (916) 657-0833
Status: Completed

Project Description:
The purpose of this two-year project is to evaluate and develop new environmental and energy technologies, and to apply existing technologies—such as electric vehicles—to airport infrastructure to reduce pollution and subsequent costs. Aviation is a key sector of California's economy, with important consumer, energy, and air quality impacts. California's largest airports contribute hundred of millions dollars every year to local and regional economies. However, airports face challenges, including the need to reduce pollutant emissions and control operating costs.
Converting ground transportation and other airport equipment to electricity is one solution to these issues. The electrification of airport gates and the use of electric ground support equipment (GSE) and alternative fuel vehicles have been identified as effective emission reduction compliance measures. These measures promote the public good of cleaner air. Additionally, the use of electric GSE offers energy efficiency and operating cost reduction benefits to airports and California's consumers. These benefits foster the achievement of high-priority public policy goals.
However, the increased use of high and variable frequency electric GSE at airports could adversely affect the quality and reliability of airport electric power systems. As a result, the potential impact of electric GSE and other electrification on power system quality must be understood if California airports are to comply with air quality requirements without compromising airport power quality. EPRI's Airport Solutions Target has developed the necessary methodologies and models to assess the feasibility of electrification and the associated economic, environmental, and power quality impacts on an airport-specific basis.
This project supports the PIER Program objectives of:

- Improving the energy cost/value of California's electricity by providing information on efficiency improvements available for use by airports.
- Improving the environmental and public health costs/risks of California's electricity by reducing emissions from the internal combustion engines used by airport facilities by replacing them with electrically-powered equipment.

Proposed Outcomes:

1. Provide key technical and economic information on electrification of GSE and other airport equipment and use of alternative fuel vehicles—including information on new technology development, environmental impacts, power quality issues, application planning and experience, and market penetration.
2. Conduct a Tailored Collaboration entitled Power Quality Impacts of Airport GSE Charging Systems (TC-51441-001-28325). This project will study the existing GSE charging systems at five airports (including four in California) to document the power quality characteristics of the systems and assess their impacts on the primary and secondary electric distribution systems that supply power to the airports and gate areas.

Actual Outcomes:
Technical and Economic Information.

1. EPRI organized a national Electric GSE Market Penetration Issues Round Table Meeting in Washington, DC. The meeting was designed to bring together representatives from airports, airlines, vehicle and component manufacturers, government agencies, standards-making bodies, and utilities to address key issues. The meeting, which was scheduled for September 12, 2001, was cancelled due to the terrorist attacks. However, the nine presentations scheduled to be delivered at the meeting were compiled in a proceedings titled *EPRI Electric GSE Market Penetration Issues Round Table Proceedings: September 2001* (1006002) and delivered to all members. The presentations contain vital information on new technology development, application experience, and power quality issues. A conference call, led by Robert Graham, was open to all Electric GSE Market penetration issues round table meeting members followed the proceedings.
2. A fact sheet—*American Airlines Installs Fast Charging at DFW Airport* (1006011) —was published on one airline's experience with fast charging technology for GSE electrification.
3. EPRI hosted two national workshops of the Electric Bus User Group. These workshops were held on April 16-17, 2001 in Tempe, AZ, and on October 9-10, 2001 in Denver, CO. The events offered participants information on new technologies, energy storage and charging issues, and application experience. The proceedings, titled *Electric Bus Users Group Workshop Proceedings: April 2001* (1006158) and *Electric Bus Users Group Workshop: Proceedings: October 2001*, (1006643), were published.
4. A conference call meeting of the Airport Solutions Target Funders was held on November 19, 2001. Minutes of the meeting are available.

Project Status:
The project has been completed.